

Transistors

# 500mA / 12V Low $V_{CE(sat)}$ Digital transistors (with built-in resistors)

## DTD513ZE / DTD513ZM

●Applications

Inverter, Interface, Driver

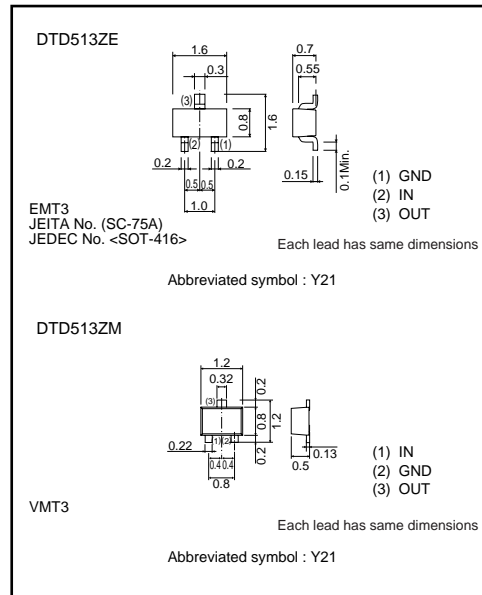
●Feature

- 1)  $V_{CE(sat)}$  is lower than conventional products.
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- 3) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
- 4) Only the on / off conditions need to be set for operation, making the device design easy.

●Structure

NPN epitaxial planar silicon transistor  
(Resistor built-in type)

●External dimensions (Unit : mm)



●Absolute maximum ratings ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Limits		Unit
		DTD513ZE	DTD513ZM	
Supply voltage	$V_{CC}$	12		V
Input voltage	$V_{IN}$	-5 to +10		V
Collector current *1	$I_{C(max)}$	500		mA
Power dissipation *2	$P_D$	150		mW
Junction temperature	$T_J$	150		$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150		$^\circ\text{C}$

\*1 Characteristics of built-in transistor.  
\*2 Each terminal mounted on a recommended land.

●Packaging specifications

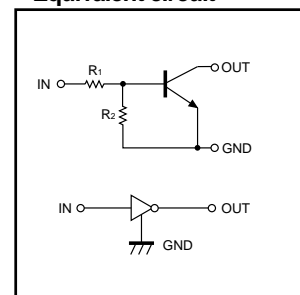
Part No.	Package	EMT3	VMT3
	Package type	Taping	Taping
	Code	TL	T2L
	Basic ordering unit (pieces)	3000	8000
DTD513ZE		○	-
DTD513ZM		-	○

●Electrical characteristics ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	-	-	0.3	V	$V_{CC}=5V, I_{O}=100\mu\text{A}$
	$V_{I(on)}$	2.5	-	-		$V_O=0.3V, I_{O}=20\text{mA}$
Output voltage	$V_{O(on)}$	-	60	300	mV	$I_{O}/I_{I}=100\text{mA} / 5\text{mA}$
Input current	$I_I$	-	-	6.4	mA	$V_I=5V$
Output current	$I_{O(off)}$	-	-	0.5	$\mu\text{A}$	$V_{CC}=12V, V_I=0V$
DC current gain	$G_I$	140	-	-	-	$V_O=2V, I_{O}=100\text{mA}$
Transition frequency *	$f_T$	-	260	-	MHz	$V_{CE}=10V, I_E=-5\text{mA}, f=100\text{MHz}$
Input resistance	$R_1$	0.7	1.0	1.3	$\text{k}\Omega$	-
Resistance ratio	$R_2/R_1$	8.0	10	12	-	-

\* Characteristics of built-in transistor.

●Equivalent circuit



$R_1=1.0\text{k}\Omega / R_2=10\text{k}\Omega$

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